Cefuroxime in pediatric practice*

COMMITTEE ON INFECTIOUS DISEASES AND IMMUNIZATION,† CANADIAN PAEDIATRIC SOCIETY

Cefuroxime (Zinacef) is a second-generation cephalosporin antibiotic that has recently been licensed in Canada for parenteral use; it has been available in Europe for several years. Like other cephalosporins, its antibacterial activity results from the inhibition of cell wall synthesis.[1]

Most of the extensive information available on the clinical use of cefuroxime is derived from clinical trials in adults.[1-3] Licensed indications include the treatment of lower respiratory tract, urinary tract and soft tissue infections caused by susceptible organisms. Cefuroxime has been used in life-threatening infections, including meningitis, sepsis and osteomyelitis, when the initial therapy had been unsuccessful. In vitro it is active against *Haemophilus influenzae* (including strains resistant to ampicillin), *Escherichia coli*, *Proteus mirabilis*, *Enterobacter* sp. and *Klebsiella* sp. Cefuroxime's activity against *Staphylococcus aureus* is maintained whether the strain produces penicillinase or not; however, methicillin-resistant strains are also resistant to cefuroxime. Most strains of *Neisseria meningitidis*, *N. gonorrhoeae*, *Streptococcus pneumoniae* and other streptococcal species are very sensitive to cefuroxime. However, *Strep. faecalis* (enterococcus) and *Pseudomonas aeruginosa* are resistant. *Listeria monocytogenes* is also resistant to cefuroxime, as it is to other cephalosporin-like antibiotics. Therefore, cefuroxime should never be used alone when *Listeria*, *Pseudomonas* or enterococci are possible causes of an infection. Cefuroxime is active against oral anaerobes and *Clostridium*, but most isolates of *Bacteroides fragilis* are resistant.

Cefuroxime is not metabolized to any extent in vivo and is excreted almost entirely by the kidneys. The serum half-life, usually 1.5 hours, is prolonged to 20 hours in anuric patients. Dosing intervals must be adjusted if the creatinine clearance is low. The drug's diffusion into soft tissues is excellent.[3] Its penetration into the cerebrospinal fluid is usually good (the levels reaching about 40% of serum levels) if the meninges are inflamed. Although one prospective randomized trial suggested that cefuroxime was equivalent to ampicillin and chloramphenicol for the treatment of meningitis,[4] experience with its use in children is limited, and cefuroxime is not recommended as a first-line drug for meningitis.

Adverse effects

The side effects encountered include all those typical of cephalosporins — rash, fever, eosinophilia, and thrombophlebitis or inflammation at the injection site — but have been infrequent.[2,3] Bleeding, a problem in some recipients of cefamandole and certain other new cephalosporins, has not been described with cefuroxime. Reactions can be anticipated in patients allergic to other cephalosporins.

Dosages

The most appropriate daily dosage for children has yet to be determined,[5-8] but 30 mg/kg is recommended for urinary tract infections, 75 to 100 mg/kg for soft tissue infections or sepsis and 200 to 240 mg/kg for meningitis. The drug should be administered at 6- to 8-hour intervals. A daily dosage of 50 mg/kg, divided into two doses, has been recommended for infants in their first week of life.[6,9]

Conclusions

The role that cefuroxime may play in the treatment of common pediatric infections is not fully determined.[10] Cefuroxime penetrates more readily into soft tissue, urine and cerebrospinal fluid than does cefamandole, another second-generation cephalosporin. It should be

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useful in treating infections that may be caused by *H. influenzae* type b, such as facial cellulitis, epiglottitis, pneumonia and septic arthritis, and it would then replace chloramphenicol. Unlike cefamandole, cefuroxime retains its activity in the presence of large inocula of ß-lactamase-producing *H. influenzae*; therapeutic failures have not been reported. Because of the high concentration achieved in the urine, cefuroxime should be an excellent antibiotic for the treatment of urinary tract infections caused by susceptible organisms. Experience in the treatment of meningitis, however, is limited, and in Canada the drug is not licensed for this indication. The cost of the drug is similar to that of cefamandole.

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